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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/787,698	03/21/2001	Ralf Neuneier	P01-0020	6143

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STAAS & HALSEY LLP
SUITE 700
1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER	
HOLMES, MICHAEL B	
ART UNIT	**PAPER NUMBER**
2121	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/787,698	NEUNEIER ET AL.	
	Examiner	Art Unit	
	Michael B. Holmes	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *(3)* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 March 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) *1-21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22-31, 33-38, 40-42* is/are rejected.

7)☒ Claim(s) *32 and 39* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. *09/787,698* .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

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Examiner's Detailed Office Action

1. This Office Action is responsive to application **09/787,698,** filed **March 21, 2001**.

2. **Claims 1-21** have been canceled. **Claims 22-42** have been added and examined.

Specification Objection

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors e.g., on page 4, applicant has made a reference to M. Heger, and spelled it as "Heger." However, on page 5, applicant has spelled it as "Hager." Applicant's cooperation is required in correcting any errors of which applicant may become aware in the specification. Appropriate correction is required.

Claim Objection(s)

4. Claims 32 & 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claim 22 are rejected under 35 U.S.C. 102(b) as being anticipated by *Ralph Neuneier*, "Enhanced Q-Learning for Optimal Asset Allocation" Advances in Neural Information Processing Systems (1997).

Regarding Claim 22:

Neuneier teaches,

- A method for computer-aided determination of a sequence of actions for a system having states, the method comprising the steps of: performing a transition in state between two states on the basis of an action **[(2.1 Q-Learning for asset allocation, page 937-938)]**; determining the sequence of actions to be performed such that a sequence of states results from the sequence of actions **[(2.1 Q-Learning for asset allocation, page 937-938)]**; optimizing the sequence of steps with regard to a prescribed optimization function, including a variable parameter **[(2.1 Q-Learning for asset allocation, page 937-938)]**; and using the variable parameter to set a risk which the resulting sequence of states has with respect to a prescribed state of the system. **[(3.1 Risk-adjusted MDP's, page 941)]**

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 23-31 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ralph Neuneier*, "Enhanced Q-Learning for Optimal Asset Allocation" Advances in Neural Information Processing Systems (1997) further in view of *Werbos* (USPN 6,169,981).

The *Neuneier* reference has been discussed above and does not explicitly teach the limitation of claims 23-24, 26, 29-30. However, *Werbos* teach the limitations of claims 23-24, 26, 29-30.

Regarding Claim 23:

Werbos teaches,

using approximate dynamic programming for the purpose of determination. **[(col. 7, line 37-38 "*In Approximate Dynamic Programming (ADP) ... model to approximate this function J.*")]** It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ approximate dynamic programming (ADP), because, ADP allows for general-purpose programming for doing optimization over time by using learning and approximation. Moreover, ADP has emerging as one of the most promising mathematical and computational approaches to resolve the problem of nonlinear, large scale dynamic control problems under uncertainty.

Regarding Claim 24:

Werbos teaches,

basing the approximate dynamic programming Q-learning. **[(col. 93, line 38-50 "***The basic equation for* "J" *given in* ...P. Werbos, ... *Still, these designs are all a step up from the* 1983 **BSA** *design.*"**)]** It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ approximate dynamic programming (ADP) Q-Learning, because, Q-Learning is a stochastic approximation-like method that iterates on the Q-factors.

Regarding Claim 25:

Neuneier teaches,

forming an optimization function within Q-learning in accordance with the following rule: ... **[(as per applicant's own admission (page 2-4)]** It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ an optimization function for specifying the expectation and gains accumulated over time.

Regarding Claim 26:

Werbos teaches,

basing the approximate dynamic programming on TD(λ)-learning. **[(col. 110, line 39-45 "***In any event, the procedure implied ... is considerably more general than any of the original*

formulation.")] It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ approximate dynamic programming on TD(λ)-learning, because, the temporal difference method is a type of reinforcement learning that learn through exploiting the difference in evaluating actions in successive steps and thus handling sequences in an incremental manner.

Regarding Claim 27:

Neuneier teaches,

forming an optimization function within Q-learning in accordance with the following rule: ... **[(as per applicant's own admission (page 8-10)]** It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ an optimization function for specifying the expectation and gains accumulated over time.

Regarding Claim 28:

Neuneier teaches,

using a technical system to determine the sequence of actions before the determination measured values are measured. **[(as per applicant's own admission (page 1)]** It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to predict a planning mechanism to determine the sequence of actions to reach the chosen goal state.

Regarding Claim 29:

Werbos teaches,

subjecting the technical system to open-loop control in accordance with the sequence of actions. **[(col. 100, line 20-28 "***In summary, the concept of learning--while not all-encompassing--could be expected to give us a parsimonious understanding ... such research is often useful only when it is integrated into a specific plan to use the sensors within a larger control loop.***")]** It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ open-loop control, because an open-loop control system is controlled directly, and only, by an input signal, without the benefit of feedback. The basic units of this system are an amplifier and a motor. The amplifier receives a low-level input signal and amplifies it enough to drive the motor to perform the desired job. Open-loop control systems are not as commonly used as closed-loop control systems because they are less accurate.

Regarding Claim 30:

Werbos teaches,

subjecting the technical system to closed-loop control in accordance with the sequence of actions. **[(col. 130, line 19-27 "***Balakrishnan has mainly studied problems in aircraft and missile control ... done tests demonstrating robustness and closed-loop "re-adaptation.***")]** It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ closed-loop control, because process improvement can be obtained by means of closed-loop control i.e., with reliable. While, the basic

idea of feed-back control is to correct disturbances, which may appear in real production processes. With reliable closed-loop control the process can often be run at paths in the state space which promise a better process performance.

Regarding Claim 31:

Neuneier teaches,

modeling the system as a Markov decision problem. **[(as per applicant's own admission (page 1)]** It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ a natural approach to developing control architectures for complex tasks is to design multiple simple components, each addressing one aspect of the task domain, and provide a framework for combining the results. When an agent must learn these components by interacting with the environment, as in a Markov decision problem, the designer must take care not to sacrifice an optimal solution for a convenient representation.

9. Claims 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ralph Neuneier*, "Enhanced Q-Learning for Optimal Asset Allocation" Advances in Neural Information Processing Systems (1997), further in view of *Howard* (USPN 6,336,109).

Regarding Claim 33:

Howard teaches,

using the system as a communications system. **[(col. 7, line 65 to col. 8, line 5 "***Another possibility is to use a neural network classifier ...specifically for telecommunications applications.***")]** It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ a processor is used in a communications system, because the processor (*computer system*) can be used to analyze data about the transmission of messages in a communications system.

Regarding Claim 34:

Howard teaches,

using the system to carry out access control in a communications network. **[(col. 1, line 11-16 "***In the telecommunications field, large amounts of data are available, for example about customer behavior and telephone usage. This data contains potentially useful information for many purposes such as detection of fraud, marketing, billing, maintenance planning and fault detection.***")]** It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ a processor is used to carry out access control in a communications network, because the processor (*computer system*) can be used to interpret, analyze and investigate user patterns of behavior in detecting e.g., telecommunications fraud.

Regarding Claim 35:

Howard teaches,

using the system to carry out a routing in a communications network. **[(col. 1, line 11-16 "***In the telecommunications field, large amounts of data are available, for example about customer behavior and telephone usage. This data contains potentially useful information for many purposes such as detection of fraud, marketing, billing, maintenance planning and fault detection.***")]** It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ a processor is used to carry out routing in a communications network, because the processor (*computer system*) can be used to interpret, analyze and investigate user patterns of behavior in detecting e.g., in relation to faults in a communications network and encryption key management.

10. Claim 36 is rejected under 35 U.S.C. 102(b) as being anticipated by Walter J. Gutjahr, "Failure Risk Estimation via Markov Software Usage Models" Department of Statistics, Operations research and Computer Science, University of Vienna, Austria (1997).

Regarding Claim 36:

Gutjahr teaches,

- A system for determining a sequence of actions for a system having states, wherein a transition in state between two states is performed on the basis of an action, the system comprising: a processor for determining a sequence of actions, whereby a sequence of states resulting from the sequence of actions is optimized

with regard to a prescribed optimization function, and the optimization function includes a variable parameter for setting a risk which the resulting sequence of states has with respect to a prescribed state of the system. **[(Abstract "**... *risk estimate* ...**)** and **(5. Experimental results, page 189-190, Table 1)]**

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Walter J. Gutjahr*, "Failure Risk Estimation via Markov Software Usage Models" Department of Statistics, Operations research and Computer Science, University of Vienna, Austria (1997), further in view of *Werbos* (USPN 6,169,981).

The *Gutjahr* reference has been discussed above and does not explicitly teach the limitation of claim 37-38. However, *Werbos* teaches the limitations of claims 37-38.

Regarding Claim 37:

Werbos teaches,

the processor is used to subject a technical system to open-loop control. **[(col. 100, line 20-28** "*In summary, the concept of learning--while not all-encompassing--could be expected to give us a parsimonious understanding ... such research is often useful only when it is integrated into a specific plan to use the sensors within a larger control loop.*")] It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ open-loop control, because an open-loop control system is controlled directly, and only, by an input signal, without the benefit of feedback. The basic units of this system are an amplifier and a motor. The amplifier receives a low-level input signal and amplifies it enough to drive the motor to perform the desired job. Open-loop control systems are not as commonly used as closed-loop control systems because they are less accurate.

Regarding Claim 38:

Werbos teaches,

the processor is used to subject a technical system to closed-loop control. **[(col. 130, line 19-27** "*Balakrishnan has mainly studied problems in aircraft and missile control ... done tests demonstrating robustness and closed-loop "re-adaptation.*")] It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ closed-loop control, because process improvement can be obtained by means of closed-loop control i.e., with reliable. While, the basic idea of feed-back control is to correct disturbances, which may appear in real production processes. With reliable closed-loop

control the process can often be run at paths in the state space which promise a better process performance.

13. Claims 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Walter J. Gutjahr*, "Failure Risk Estimation via Markov Software Usage Models" Department of Statistics, Operations research and Computer Science, University of Vienna, Austria (1997), further view of *Howard* (USPN 6,336,109).

Regarding Claim 40:

Howard teaches,

the processor is used in a communications system. **[(col. 7, line 65 to col. 8, line 5 "***Another possibility is to use a neural network classifier ...specifically for telecommunications applications.***")]** It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ a processor is used in a communications system, because the processor (*computer system*) can be used to analyze data about the transmission of messages in a communications system.

Regarding Claim 41:

Howard teaches,

the processor is used to carry out access control in a communications network. **[(col. 1, line 11-16 "***In the telecommunications field, large amounts of data are available, for example about customer behavior and telephone usage. This data contains potentially useful information for*

many purposes such as detection of fraud, marketing, billing, maintenance planning and fault detection.")] It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ a processor is used to carry out access control in a communications network, because the processor (*computer system*) can be used to interpret, analyze and investigate user patterns of behavior in detecting e.g., telecommunications fraud.

Regarding Claim 42:

Howard teaches,

the processor is used to carry out routing in a communications network. **[(col. 1, line 11-16 "***In the telecommunications field, large amounts of data are available, for example about customer behavior and telephone usage. This data contains potentially useful information for many purposes such as detection of fraud, marketing, billing, maintenance planning and fault detection.*")] It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to employ a processor is used to carry out routing in a communications network, because the processor (*computer system*) can be used to interpret, analyze and investigate user patterns of behavior in detecting e.g., in relation to faults in a communications network and encryption key management.

Conclusion

14. Office personnel are to give claims their **"broadest reasonable interpretation"** in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551(CCPA 1969). See *also *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322(Fed. Cir. 1989) ("During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow. . . . The reason is simply that during patent prosecution when claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed. . . . An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process."). *see* MPEP § 2106. Finally, examiner interprets the "*Discussion of the Related Art*" as prior art and applicant's own admission regarding what is known in the arts.

Correspondence Information

15. Any inquires concerning this communication or earlier communications from the examiner should be directed to **Michael B. Holmes**, who may be reached Monday through Friday, between 8:00 a.m. and 5:00 p.m. EST. or via telephone at **(571) 272-3686** or facsimile transmission **(571) 273-3686** or email Michael.holmesb@uspto.gov.

If attempts to reach the examiner are unsuccessful the **Examiner's Supervisor, Anthony Knight**, may be reached at **(571) 272-3687**.

Michael B. Holmes
Patent Examiner
Artificial Intelligence
Art Unit 2121
United States Department of Commerce
Patent & Trademark Office